The Monitor

The Newsletter of the ETV Advanced Monitoring Systems (AMS) Pilot

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Ambient Fine Particulate Monitors: Testing to Begin Soon

Late this year, the AMS pilot will begin verification testing of ambient fine particulate monitors – important tools for measuring and characterizing air pollution. This category is the third type to be tested by the AMS pilot. In the near future, optical open-path monitors will also be tested.

"Particulate matter" (PM) is a term used to describe air pollution that consists of various types of particles suspended in the air we breathe. According to the American Lung Association, PM is a combination of fine solids such as dirt, soil dust, pollens, molds, ashes, and soot, as well as aerosols that are formed in the atmosphere from gaseous combustion by-products such as volatile organic compounds, sulfur dioxide, and nitrogen oxides. PM comes from sources such as factory and utility smokestacks, vehicle exhaust, wood burning, mining, construction activity, and agriculture.

The size of airborne particles affects their toxicity. For example, ambient air standards address the mass of particles smaller than 10 micrometers in diameter, designated as "PM10." Fine particles, less than 2.5 micrometers in diameter, are of special concern because they can be inhaled deeply into the lungs. These are referred to as "PM2.5."

Federal standards have been set to regulate the maximum permissible PM10 level to 150 micrograms per cubic meter of air, as a daily average, and 50 micrograms per cubic meter, as an annual average. In 1997, the U.S. EPA set further standards for PM2.5 that will be phased in over the next decade.

Measurements to determine if the standards for PM are met are based on collecting PM on a filter and weighing it. However, for many research purposes, newer technologies for continuously monitoring particulate matter are valuable. Ambient fine particulate monitors are available, but they have had limited acceptance in part because of the lack of independent verification data.

These monitors continuously measure the mass, number, light scattering intensity, or chemical composition of fine particles in the air. The devices to be tested by the AMS pilot are capable of continuous or semi-continuous monitoring of fine particles and do not require separate steps for collecting, preparing, and analyzing air samples. The technologies will be tested for:

- Accuracy assessment relative to filter-based methods that determine particulate chemical composition
- Correlation with mass-based methods for other continuous monitors
- Effects of weather conditions on performance
- Influence of pollutant gases on the instrument responses
- Reliability
- Ease of use
- Overall cost.

Beginning in late 1999, two separate phases of the testing will be conducted in different geographic locations – Fresno, CA, and Pittsburgh, PA – during different seasons, to assess the effects of temperature, humidity, PM concentration, and chemical composition. Six to 10 vendors are expected to participate. Interested vendors may contact Ken Cowen at 614-424-5547 or cowenk@battelle.org for more information.

Example ambient fine particulate monitor

Series 5400, photos courtesy of Rupprecht & Patashnick, Co.

Note to Vendors

For general information about all AMS verification tests – Tom Kelly, 614-424-3495 or kellyt@battelle.org.

For information about upcoming testing of **optical open-path monitors** – Jeff Myers, 614-424-7705 or myersjd@battelle.org.

The AMS pilot is one of 12 pilots in the U.S. Environmental Protection Agency's Environmental Technology Verification Program. ETV was established to accelerate the development and commercialization of improved environmental technologies through third-party verification testing and reporting of the technologies' performance. The ETV process provides purchasers and permitters with an independent assessment of the technology they are buying or permitting and facilitates multi-state acceptance. For further information, contact Helen Latham at Battelle, 505 King Ave., Columbus, Ohio 43201-2693; Phone 614-424-4062; Fax 614-424-5601; E-mail lathamh@battelle.org.

Meet the Stakeholder Committees

Two members of the AMS pilot's stakeholder committees are spotlighted in each issue of *The Monitor* – one each from the air and water committees.

Paul L. Knechtges
Water Stakeholder Committee

Dr. Knechtges works for Sherikon, Inc., as a contract scientist assigned to the Department of Defense. An environmental health scientist with over 17 years of experience, Dr. Knechtges has credentials in environmental health practice, industrial hygiene, and environmental management. He graduated s*umma cum laude* from East Carolina University in with a B.S. in environmental health. He received an M.S. in environmental science from George Washington University and a Ph.D. in environmental biology and public policy from George Mason University. Dr. Knechtges has authored numerous professional journal articles and government studies and documents. He is a member of the American Public Health Association, the National Environmental Health Association, and the Society for Risk Analysis. He has served on many government committees and working groups, including those sponsored by the National Institute for Occupational Safety and Health (NIOSH) and the Environmental Protection Agency (EPA). During his 26-year military career, Dr. Knechtges supervised occupational medicine and industrial hygiene services for Naval facilities and research laboratories; was a member of a Navy/Marine Corps deployable field hospital at Camp Lejeune, NC; and supervised occupational health and preventive medicine support to Navy and Marine Corps units. Dr. Knechtges also served as manager for the Navy's Environmental and Occupational Medicine Research Program, which involved managing research and development programs in the fields of toxicology, bio-effects of electromagnetic radiation, epidemiology, and environmental monitoring technology.

Peter K. Mueller
Air Stakeholder Committee

Dr. Mueller is the program manager for atmospheric sciences at EPRI in Palo Alto, CA, where he is currently conducting projects on atmospheric aerosols, ozone occurrence, and climate change simulation. Prior to his work at EPRI, he was general manager of the Environmental Chemistry Center for Environmental Research and Technology, Inc., where he supervised operations in California and Massachusetts which conducted sponsored laboratory and field studies on atmospheric aerosols and on the chemistry of other environmental topics. In the early 1970s, he was chief of laboratory services for the U.S. EPA's Region IX in San Francisco. There he managed and developed the operations of the laboratory and coordinated federal, state, and local agency concerns on the scientific aspects of emerging air quality control issues. From 1963 to 1973, he was the chief of the Air and Industrial Hygiene Laboratory for the California Department of Health. Dr. Mueller has also taught in the Department of Oceanography at Florida State University and worked as a research chemist. His affiliations include the American Chemical Society, Air & Waste Management Association, American Association for the Advancement of Science, and the American Geophysical Union. He received his B.S. in chemistry from George Washington University and an M.S. and Ph.D. in environmental sciences from Rutgers University. Dr. Mueller is the author of over 60 publications in refereed journals and books on atmospheric and environmental topics.

Stakeholders Contribute to Verification Process

Members of the AMS pilot's air and water stakeholder committees serve several functions in the verification test process. The committees start the AMS pilot's verification process by identifying and prioritizing needed air and water monitoring technologies.

Individual committee members are volunteering to assist with specific technology categories as they proceed through the verification process. The volunteers participate in vendor meetings where the test plan is discussed; review the draft test/QA plans; observe the verification tests; and review the verification reports.

Ten members of the AMS pilot's air and water stakeholder committees are currently participating in the verification process. They are:

Air

NO/NO_2 analyzers– Dr. Donald Stedman, University of Denver; and Geri Hart, Pollution Prevention Division, Tinker AFB.

Fine particulate monitors– Lee Byrd, U.S. EPA, Office of Air Quality Planning and Standards; Jeff Cook, California Air Resources Board; Rudy Eden, South Coast Air Quality Management District; and Tom Moore, Arizona Department of Environmental Quality.

Optical open path monitors– Cliff Glowacki, Casting Emission Reduction Program; and Roy Owens, Owens Corning.

Water

Turbidimeters–Geoff Dates, River Watch Network; and Richard Sakaji, California Department of Health Services.

Upcoming Events

September 23-24, 1999
AMS pilot's Air Stakeholder Committee meeting, Cape Cod, MA

October 4-7
Association of State Drinking Water Administrators, 14th Annual Conference, Hotel Royal Plaza, Lake Buena Vista, FL

October 20-21
AMS pilot's Water Stakeholder Committee meeting, San Diego, CA

October 31 - November 3
AWWA Water Quality Technology Conference, Tampa, FL

Visit the AMS pilot on the Web at http://www.epa.gov/etv/07/07_main.htm.